NOTICE OF OFFICE OF MANAGEMENT AND BUDGET ACTION

Linda Engelmeier 03/04/2000
Department of Commerce
14th and Constitution Avenue NW
Room 5327
Washington, DC 20230

In accordance with the Paperwork Reduction Act, OMB has taken the following action on your request for approval of a revision of an information collection received on 12/07/1999.

TITLE: The GLOBE Program

AGENCY FORM NUMBER(S): None

ACTION : APPROVED
OMB NO.: 0648-0310
EXPIRATION DATE: 03/31/2003

BURDEN	RESPONSES	BURDEN HOURS	BURDEN COSTS
Previous	1,680	817	0
New	1,062	770	0
Difference	-618	-47	0
Program Change		-47	0
Adjustment		0	0

TERMS OF CLEARANCE: None

NOTE: The agency is required to display the OMB control number and inform respondents of its legal significance (see 5 CFR 1320.5(b)).

OMB Authorizing Official Title

Donald R. Arbuckle Deputy Administrator, Office of Information and Regulatory Affairs

PAPERWORK REDUCTION ACT SUBMISSION

Please read the instructions before completing this form. For additional forms or assistance in completing this form, contact your agency's Paperwork Clearance Officer. Send two copies of this form, the collection instrument to be reviewed, the supporting statement, and any additional documentation to: Office of Information and Regulatory Affairs, Office of Management and Budget, Docket Library, Room 10102, 725 17th Street NW, Washington, DC 20503.

1. Agency/Subagency originating request
DOC/NOAA/HPCC

2. OMB control number b. [ ] None
a. 0648 - 0310

3. Type of information collection (*check one*)
a. [ ] New Collection
b. [✔] Revision of a currently approved collection
c. [ ] Extension of a currently approved collection
d. [ ] Reinstatement, without change, of a previously approved collection for which approval has expired
e. [ ] Reinstatement, with change, of a previously approved collection for which approval has expired
f. [ ] Existing collection in use without an OMB control number
For b-f, note Item A2 of Supporting Statement instructions

4. Type of review requested (*check one*)
a. [✔] Regular submission
b. [ ] Emergency - Approval requested by ____/____/____
c. [ ] Delegated

5. Small entities
Will this information collection have a significant economic impact on a substantial number of small entities? [ ] Yes [✔] No

6. Requested expiration date
a. [✔] Three years from approval date b. [ ] Other Specify: ____/____

7. Title The GLOBE Program

8. Agency form number(s) (*if applicable*) N/A

9. Keywords 'education, research'

10. Abstract

The GLOBE (Global Learning and Observations to Benefit the Environment) Program is an international environmental science and education program that joins students, teachers, and scientists from around the world to study the global environment. Information is needed from participating teachers and students to help guide the continued evolution of the program.

11. Affected public (*Mark primary with "P" and all others that apply with "x"*)
a. P Individuals or households d. ___ Farms
b. ___ Business or other for-profit e. ___ Federal Government
c. ___ Not-for-profit institutions f. ___ State, Local or Tribal Government

12. Obligation to respond (*check one*)
a. [✔] Voluntary
b. [ ] Required to obtain or retain benefits
c. [ ] Mandatory

13. Annual recordkeeping and reporting burden
a. Number of respondents 1,062
b. Total annual responses 1,062
1. Percentage of these responses collected electronically 65 %
c. Total annual hours requested 770
d. Current OMB inventory 817
e. Difference -47
f. Explanation of difference
1. Program change -47
2. Adjustment

14. Annual reporting and recordkeeping cost burden *(in thousands of dollars)*
a. Total annualized capital/startup costs 0
b. Total annual costs (O&M) 0
c. Total annualized cost requested 0
d. Current OMB inventory 0
e. Difference 0
f. Explanation of difference
1. Program change
2. Adjustment

15. Purpose of information collection (*Mark primary with "P" and all others that apply with "X"*)
a. ___ Application for benefits e. x Program planning or management
b. P Program evaluation f. ___ Research
c. ___ General purpose statistics g. ___ Regulatory or compliance
d. ___ Audit

16. Frequency of recordkeeping or reporting *(check all that apply)*
a. [ ] Recordkeeping b. [ ] Third party disclosure
c. [✔] Reporting
1. [ ] On occasion 2. [ ] Weekly 3. [ ] Monthly
4. [ ] Quarterly 5. [✔] Semi-annually 6. [ ] Annually
7. [ ] Biennially 8. [ ] Other (describe)

17. Statistical methods
Does this information collection employ statistical methods
[✔] Yes [ ] No

18. Agency Contact (person who can best answer questions regarding the content of this submission)
Name: Thomas Pyke
Phone: 202-395-7600

19. Certification for Paperwork Reduction Act Submissions

On behalf of this Federal Agency, I certify that the collection of information encompassed by this request complies with 5 CFR 1320.9

NOTE: The text of 5 CFR 1320.9, and the related provisions of 5 CFR 1320.8(b)(3), appear at the end of the instructions. *The certification is to be made with reference to those regulatory provisions as set forth in the instructions.*

The following is a summary of the topics, regarding the proposed collection of information, that the certification covers:

(a) It is necessary for the proper performance of agency functions;

(b) It avoids unnecessary duplication;

(c) It reduces burden on small entities;

(d) It used plain, coherent, and unambiguous terminology that is understandable to respondents;

(e) Its implementation will be consistent and compatible with current reporting and recordkeeping practices;

(f) It indicates the retention period for recordkeeping requirements;

(g) It informs respondents of the information called for under 5 CFR 1320.8(b)(3):

(i) Why the information is being collected;

(ii) Use of information;

(iii) Burden estimate;

(iv) Nature of response (voluntary, required for a benefit, mandatory);

(v) Nature and extent of confidentiality; and

(vi) Need to display currently valid OMB control number;

(h) It was developed by an office that has planned and allocated resources for the efficient and effective management and use of the information to be collected (see note in Item 19 of instructions);

(i) It uses effective and efficient statistical survey methodology; and

(j) It makes appropriate use of information technology.

If you are unable to certify compliance with any of the provisions, identify the item below and explain the reason in Item 18 of the Supporting Statement.

Signature of Senior Official or designee	Date

Agency Certification (signature of Assistant Administrator or head of MB staff for L.O.s, or of the Director of a Program or Staff Office)	
Signature signed by Thomas Pyke	Date 6/11/99
Signature of NOAA Clearance Officer	
Signature signed by Richard Roberts, NOAA Clearance Officer	Date 11/24/99

SUPPORTING STATEMENT

FOR A

PAPERWORK REDUCTION ACT SUBMISSION FOR

THE GLOBE PROGRAM

INTRODUCTION

Background

Global Learning and Observations to Benefit the Environment (GLOBE) is an international science and environmental education program involving elementary and secondary students in the United States and around the world. Students make environmental observations at their schools and share their data with each other and with scientists through the Internet. Using methods developed by leading scientists, students are taking measurements of selected atmospheric, hydrological, biological, and geological conditions. The students then send their data via the Internet to be stored and made available to the world through the GLOBE Student Data Archive. Students receive back environmental images vividly depicting their observations together with those of all other GLOBE schools around the world.

GLOBE educational materials guide students in understanding their observations. A distinguished group of scientists selected the set of GLOBE measurements on the basis of their relationship to central concepts in Earth science and of the contributions the student data could make toward improving the scientific understanding of the planet. Twelve science investigators, each with a partner education specialist, help develop educational materials and provide science and education assistance to the schools.

GLOBE, an initiative launched by President Bill Clinton and Vice President Al Gore, is a program in which students from all over the world are aiding the scientific community by taking environmental measurements in their communities and reporting their findings over the Internet. The kids learn from the experts; the experts learn from the kids. The GLOBE Leadership Council is chaired by the Vice President, and includes the President's Science Advisor, the Chair of the Council on Environmental Quality, and leaders of participating agencies. The program is managed as an interagency effort led by the National Oceanic and Atmospheric Administration (NOAA). The other agencies involved in the program are the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), the Environmental Protection Agency (EPA), and the Departments of Education and State. The GLOBE Program's mission is:

- to enhance the environmental awareness of individuals worldwide,
- to increase scientific understanding of the Earth, and
- to improve achievement in science and mathematics education.

The GLOBE Program was announced on Earth Day in April 1994. Students began reporting data on April 22, 1995, via their Internet connections, to the GLOBE data processing center operated by NOAA's Forecast Systems Laboratory in Boulder, Colorado. By July 1999, the GLOBE Program had established itself worldwide with more than 7,200 GLOBE schools in 84 countries. Of these schools, over 5,300 were in the

United States and more than 1,900 were non-U.S. schools. Worldwide, over 10,300 teachers have been trained to implement GLOBE. Of these teachers, more than 7,900 are U.S. teachers and over 2,400 are from other countries.

GLOBE has been established and managed from the beginning as a set of partnerships—between students and scientists, among Federal agencies, between the public and private sectors, and among many nations. The Federal GLOBE Program has entered into no-exchange-of-funds partnerships with more than 80 other nations and over 90 state governments, local school districts and universities covering most of the United States. These international and domestic partners have accepted the financial responsibility for providing training and follow-up support for GLOBE schools in their areas. GLOBE's partners are leveraging their local investments in GLOBE on the Federal commitment to the program's scientific and educational infrastructure. This infrastructure enables these local entities to deliver this high quality program to schools in their areas in a way that best fits in with local needs. These partnerships are critical in the training of GLOBE teachers, who must complete a training program in which they learn to guide students in making GLOBE measurements using the GLOBE measurement protocols, and to facilitate the learning activities in the GLOBE Teacher's Guide. Interdisciplinary teams of scientists, educators, and technology specialists conduct GLOBE teacher training at sites nationwide and at selected locations in regions around the world.

GLOBE is structured to enable partners, domestic and international, to leverage the U.S. Government investment in GLOBE science, education, and computer and networking systems as they move aggressively to expand the program in their areas. GLOBE international partner countries each provide all the resources and management necessary for their involvement. GLOBE schools in the United States are recruited, trained, and mentored by GLOBE "franchises" established on a no-exchange-of-funds basis by school districts, science centers, state departments of education, and universities across the country.

Broad international participation is integral to the design of the GLOBE Program and to the achievement of its goals. Over 80 nations have become GLOBE partners, and GLOBE continues to seek the participation of countries throughout the world. Bilateral agreements specify the respective roles and responsibilities of the United States and its international partners. GLOBE international agreements provide for long-term, durable partnerships based on the concept of mutual benefit. Cooperation is conducted on a no-exchange-of-funds basis. Each GLOBE partner country agrees to manage the implementation of GLOBE in its country and to identify resources to support the GLOBE Program in its schools. The U.S. agrees to maintain the continuing core GLOBE science, education, and systems infrastructure and to train GLOBE trainers in each country, who, in turn, train its teachers.

GLOBE is growing domestically through community support and involvement, with local and state, public and private resources. GLOBE has created a "franchise" concept to capitalize on the enthusiastic regional, state, and local commitment to GLOBE. Non-exclusive franchises, typically operated by universities, state-wide and local school systems, and regional consortia, accept the responsibility for recruiting GLOBE schools, training GLOBE teachers and mentoring GLOBE students in a defined geographic area. GLOBE provides training for the franchise partner's teacher trainers. GLOBE also provides educational materials for the GLOBE schools in the franchise partner's defined geographic area, as well as GLOBE registration of the schools, and all of the on-going support that is provided to all GLOBE schools, e.g., updated materials, access to GLOBE Web servers, use of GLOBEMail, interaction with GLOBE scientists, and access to the GLOBE Help Desk.

Through GLOBE's continuing "traditional" training of U.S. teachers at university sites across the country and the rapid growth of these GLOBE franchises, GLOBE is growing well in the United States. The GLOBE Program is growing well through its partnerships with other organizations both in the United States and worldwide, and GLOBE is being well received for both its scientific and educational value.

Purposes of Study

This information collection will provide GLOBE Program managers and staff critical information needed to enhance the quality of the program and guide its improvement on a timely basis, by obtaining feedback from participating teachers, students, trainers, and scientists. It is anticipated that over the next decade a large number of the 2 million K-12 or equivalent schools around the world will participate in GLOBE.

SRI International was selected through a competitive grant process to provide GLOBE's evaluation component. Findings from the first evaluation grant, which began in May 1995, and ended in April 1998, have already played a significant role in shaping the policies and nature of the GLOBE Program. This data collection continues the GLOBE evaluation activities through 2002.

To help ensure that the GLOBE Program continues to be implemented so as to best carry out its mission, the data obtained will enable evaluation of the program in the following areas:

- *Implementation issues*
  - Number and characteristics of participating classrooms
  - Extent to which various components of GLOBE are being implemented
  - Challenges encountered in implementing GLOBE and strategies for dealing with them
  - Models for implementing GLOBE at the classroom, school, and district levels

- Effectiveness of GLOBE teacher training and support, including the use of "franchises," and expected utility of potential enhancements

- *Effects on students*
  - Attitudes and interest regarding science
  - Understanding of basic science and measurement concepts
  - Skills in measurement, data manipulation, and technology use
  - Environmental awareness
- *Effects on teachers*
  - Movement toward hands-on, inquiry-based science
  - Integration of science with mathematics and other subject areas
- *Contribution to science*
  - Extent to which student data are accurate and reliable
  - Extent to which student data are used by scientists

Overview of Study

The evaluation involves the collection of both quantitative and qualitative data from surveys, assessments, case studies, and electronic document reviews. Specifically, the study data sources are:

- *Records of student data submissions and interactions over the network.*
- *Teacher surveys.* A survey of a sample of GLOBE teachers will be conducted annually, each spring, for the school years (SY) 1999/00, 2000/01, and 2001/02. The survey will be available on-line and as a print version. A sample of teachers in countries other than the United States will be surveyed at the same time as the U.S. teachers. The international survey also will have both on-line and print versions and will be identical to that used for U.S. teachers, except where differences in the education systems require minor wording changes (e.g., grade designations).
- *Globe partners survey*. The partners survey will be administered to two groups of GLOBE training providers. The first group to receive the survey will be outside organizations or "franchises" that provide most of the GLOBE training within the United States. These franchises use a variety of approaches or training models to deliver GLOBE training. The partners survey will as certain key information from the training partner, such as length of the training provided, nature of material covered, provisions for follow-up or refresher training, and other training practices. The partners survey will be provided to the universe of franchise directors. The second group of GLOBE training providers to be surveyed will be the international partners. Country coordinators also will

complete the partners survey to document the characteristics of the GLOBE training and program support as it is implemented in their nations.

- *Survey of scientist principal investigators.* In the final year of the evaluation, we will conduct an on-line survey of scientist principal investigators. These scientists will be surveyed concerning the use they have made of the GLOBE student data, the outcomes of analyses they have done on data quality in their investigation area, the number and types of peer-reviewed publications they have prepared using GLOBE data, and the use of the data by other scientists. This survey, administered via the World Wide Web, will have relatively few questions, but many of the questions will call for open-ended responses.

- *Student assessment.* The Web-based performance assessment of students' knowledge will be conducted with middle/jr. high and high school students from classrooms that reported data since September 1998. The assessment will measure environmental awareness and scientific problem-solving involving measurement and Earth science concepts. The Web-based assessment will also contain an attitudinal item designed to measure what it means to students to do science. During Year 2, a sample of 20 middle school and high school classrooms that represent high and low implementers of the GLOBE Program will be tested using an on-line assessment. During Year 4, another student assessment, which may or may not be a Web-based performance assessment, will be conducted to measure new GLOBE content that will have been developed. Results of the Year 2 assessment will be used to determine whether the Year 4 student assessments should be Web-based performance assessments or should be individual assessments based on the GLOBE assessment item bank (developed during the first evaluation grant).

- *Observations and interviews in selected GLOBE sites.* In six purposively selected sites in the continental United States, observations and interviews and interviews will be conducted during SY 1999/00, SY 2000/01, and SY 2001/02. These site visits will be used to gather qualitative data to supplement and triangulate the information from surveys, assessments, and electronic databases. Sites will represent different levels of school (elementary, middle, secondary), different models of implementation (within regular curriculum vs. special class or after-school activity; single classroom vs. multiple classes vs. multi-school), and different settings (geographic regions and urbanicity). Each site will be treated as a "mini case study" with researcher logs, recorded unstructured interviews, and observations of students working on GLOBE activities.

Overview of Instruments to Be Cleared

This package covers the teacher survey, survey of GLOBE partners (franchises and international training providers), student assessment, scientist PI survey, and the interview protocols to be used with teachers and students at the case study sites. The central purposes of the instruments are to:

- Provide information on how GLOBE classroom protocols and activities are actually implemented, including the frequency, nature, and breadth of student participation.
- Document implementation problems and the strategies developed for overcoming these problems.
- Document characteristics and variations in GLOBE training and their relationship to later program outcomes.
- Assess student awareness of the environment.
- Assess how students think about and apply measurement procedures, knowledge of Earth systems, and scientific inference-making after different amounts of exposure to GLOBE activities.
- Assess student attitudes toward what it means to do science.
- Assess GLOBE's contribution to world knowledge of Earth systems as evidenced by scientist principal investigators' use of GLOBE data.

Surveys

The teacher survey has been developed in a print format and a computer-based, interactive format that allows teachers to enter data via the World Wide Web if they wish to do so. Teachers at international locations also will have access to both the interactive and print surveys. SRI's experience conducting the GLOBE teacher surveys in 1996-98 has influenced the procedures to be used in this data collection. In the first two years, international teachers were sent print versions of the survey only because of limitations on Internet access. In the third year, international teachers were given the option of responding through the Web, and a relatively large percentage of international teachers returned their survey via the Internet. All future surveys will be available to international as well as U.S. teachers through the Web.

In the spring of SY 1999/00, the *teacher survey* will be distributed to a random sample of 500 teachers whose classrooms have submitted at least three kinds of GLOBE data and made submissions at least twice a month during January and February. A second random sample of comparable size will be drawn, which will be composed of teachers who were trained, but who did not submit data to GLOBE. This second sample represents nonimplementers. The survey responses of the implementers and nonimplementers will be compared, and barriers to GLOBE implementation will be identified. A somewhat smaller sample (n=450) of teachers will be used in conducting the SY 2000/01 and SY 2001/02 teacher surveys.

Slight modifications to the survey items (reflecting changes in the GLOBE materials and training activities) are anticipated for each of the annual teacher surveys. Basic survey format, organization, and respondent groups, however, will not change.

In the spring of 2000/01, the *GLOBE partner survey* will be distributed to the universe of U.S. franchise directors whose organizations train GLOBE teachers. In the spring of 2001/02, the universe of international country coordinators will be surveyed using the GLOBE partner survey.

In SY 2001/02, a survey will be administered to the *scientist principal investigators* concerning the uses they made of GLOBE data. Approximately 25 scientists from the first round of grants (the developers of the GLOBE II protocols) and from the current round (Area I grantees) will be surveyed. About seven of those individuals surveyed will be scientists who developed GLOBE II materials and who participated in the prior survey in 1998. Even if these individuals are not principal investigators under the current round of awards, the survey can be used to follow up on their use, analysis, and publication of data collected with the GLOBE protocols.

Data collection will involve several steps for each of the surveys. For the teacher sample, we will send a letter, signed by the GLOBE director, describing the survey process, emphasizing the importance of the evaluation in providing feedback to the program and to the local sites, and making clear that names will be stripped from returned data and analysis performed on aggregate data only. The packet will contain both a print version of the survey and the URL for the Web version. We will post the surveys on the World Wide Web with instructions for completion. We will follow up nonrespondents through electronic mail, regular mail, and telephone calls, as necessary, providing print versions of the survey if they prefer to use this medium. Similar procedures will be followed for the GLOBE partner survey and the scientist PI survey.

Assessments

Middle school and high school students will receive an on-line version of a learning assessment that consists of questions probing students' environmental awareness and understanding of the key science concepts GLOBE strives to foster. Two forms of the assessment will be prepared—one for middle school students and a second form for high school students. Middle school students are provided with a model of how to make a presentation, based on an expert's argument. High school students are not provided with any scaffolded instruction. The assessment items were pilot tested with a small group of middle school and high school students (n=9) during the spring of SY 1998/99. A field test of the assessment was conducted in the spring of SY 1998/99. A revised learning assessment will be developed and administered in Years 2 and 4 of the evaluation. The nature of the Year 4 assessments will reflect the results of the assessments developed and piloted in SY 1999/00. These assessments may be Web-based performance assessments, similar to those developed in 1999, or they may be individual assessments based on the GLOBE item bank. The item bank is composed of science items developed in collaboration with TERC (the GLOBE curriculum integration grantee) and participating scientists, and draws on relevant science items used in earlier international, national, and

state assessments. In addition to the items measuring learning, the assessment will contain an attitude item intended to measure students' idea of what it means to do science.

For the student assessment, teachers will receive a letter from the GLOBE director describing the importance of the assessment, explaining the assessment procedures, and guaranteeing the confidentiality of the student data. Students will be assigned a coded user name and password. No individual students' names will be identified anywhere in the assessment. Student work will be posted on the World Wide Web for other groups of students to see. Classrooms that fail to respond will be followed up with electronic mail and telephone calls.

Site Visit Protocols

Site visit protocols will be developed to allow us to:

- Identify different practices in GLOBE implementation.
- Interview teachers concerning the ways in which GLOBE activities fit into the larger curriculum of the classroom.
- Observe the ways in which GLOBE activities unfold, including both problems encountered and facilitators.
- Interview students concerning their experiences with GLOBE activities and what they feel they are getting out of them.

SRI, GLOBE's program evaluation grantee, has well-developed procedures for arranging cooperation with sites, designing site visit observation and interview protocols, and training all site visitors before they begin fieldwork. We will not collect video footage on-site, but we will ask for copies of any video developed at the site or by the individual projects.

How the Information to Be Collected Relates to the Research Questions

Table 1 specifies the objectives to be addressed in the evaluation. Column 2 identifies the instrument, items (and subitems) that are designed to elicit responses relating to each objective. Column 3 discusses the content of the items used to measure attainment of particular objectives.

Table 1

Relationship between GLOBE Program Evaluation Objectives and Items on Evaluation Instruments

Evaluation Objectives	Instrument Items	Discussion
Implementation Issues Number and characteristics of participating classrooms	TS* A.1, A.3, A.4, B.1, B.4, B.5, B.6	Number of teachers implementing GLOBE, types of classes or other settings involved, numbers and grade levels of participating students.
Extent to which the GLOBE Program and its specific components are being implemented	TS A.4, A.6., B.2, B.8, B.9, B.10, B.11Aa-f, B.11Ba-, B.11Ca-d, B.11Da-f, B.11Ea- b, B.13Aa-g, B.13 Ba-h,B.13Ca-h, B.13Da-g, B.13Ea-e, B.13Fa-g	Number of students involved with each component in typical week, which GLOBE protocols and activities are being implemented.
Models for implementing GLOBE at the classroom, school, and district levels	TS B.7	Type of classroom organization used.
Challenges encountered in implementing GLOBE and reasons for implementing protocols and activities	TS A.5, B.3, B.12, B.14	Possible challenges include lack of time, funds, administration support.
Effectiveness of GLOBE teacher training (including the use of franchises and international partners) and other supports; and expected utility of potential enhancements	TS B.17Aa-b, B.17Ba-b, B.17Ca-b, B.17Da-b, B.17Ea-b, B.17Fa, B.17Ga-d, B.18Aa-f, B.18Ba-l, B.18Ca-d, B.18Da-f, B.18Ea-b, B.19 All items from the GLOBE Partner Survey	Teacher survey asks which support tools are used, barriers that could have been addressed by appropriate training, desirability of potential supports; preparedness to implement protocols and learning activities. GLOBE partner survey items address: targeting and recruiting practices; training format; characteristics of trainers; typical training practices; nature of support provided after training; identification of effective training practices; benefits of participating in the program; challenges facing their program.

*TS = Teacher survey.

Table 1 (Concluded)

Relationship between GLOBE Program Evaluation Objectives and Items on Evaluation Instruments

Evaluation Objectives	**Instrument Items**	**Discussion**
Effects on Students Attitudes and interest regarding science	Student Assessment Addendum: attitude item on "What it is like to do science"	
Understanding of basic science and measurement concepts	TS B.16a-g Student assessment items	Teacher survey gathers teachers' judgments about the amount their students' knowledge has increased in Earth science (i.e., hydrology, atmosphere and climate, land cover, soil, global positioning system, seasonal cycles, and geography). Assessment items measure some of this content directly.
Skills in measurement, data manipulation, and technology use	TS B.15a-j Student assessment items On-site observations and interviews	Assessment items measure students' skills directly in terms of manipulation and interpretation of data, map use, technology use, critical thinking skills, and environmental awareness. Data from the teacher survey gathers teacher judgments on students' skills.
Effects on Teachers Movement toward hands-on, inquiry-based science	On-site observations and interviews	
Integration of science with mathematics and other subjects	On-site observations and interviews	
Contribution to Science Extent to which student data are accurate and reliable Extent to which student data are used by scientists	All items from scientist PI survey	

A. JUSTIFICATION

1. Circumstances Making Information Collection Necessary

GLOBE is an ambitious science and education program that continues to evolve even as it penetrates thousands of classrooms in the United States and around the world. GLOBE materials and training are being developed in a phased approach, with a new Teacher's Guide being implemented in 2000. Individuals responsible for developing and/or revising these materials need to know how teachers are using GLOBE materials, which parts of the program are working well, and which parts require improvement. In addition, the program needs basic information concerning how many students at particular grade levels and settings are participating in the program. Program managers need to understand the number of students and teachers being affected by GLOBE and the impact that the program is having on teaching and learning, to make optimal resource management decisions.

2. How, by Whom, and for What Purpose Information Is to Be Used

The evaluation will serve the following constituencies:

- The GLOBE Program will use the information to understand the extent to which, and the ways in which, GLOBE objectives are being met.
- GLOBE science/education teams developing GLOBE education activities will be provided with feedback about how teachers use GLOBE materials and what students do and do not understand from existing activities.
- Teacher training teams will receive feedback to help improve their practices and identify places where further work might be needed.
- Participating classes and schools will be provided with insights into effective ways to implement GLOBE activities and help teachers improve practice.
- The international research and development community will benefit from the examination and documentation of this large-scale, Internet-supported science project.

3. Use of Improved Information Technology to Reduce Burden

Teachers and students reporting GLOBE data are using the Internet to enter measurement results into the GLOBE database, to access data such as visualization products, and to send and receive electronic mail. They routinely use a data entry form that resides on the World Wide Web to input their measurement results. Because of their familiarity with and access to this medium, and because the data-reporting respondents have ready Internet access, it is appropriate that the evaluation employ the same type of technology to field its surveys and assessments.

Teachers and students will be encouraged to use the interactive forms of instruments residing on the World Wide Web for data collection. The forms have been designed for ease of input, and entry is intuitive and rapid. When the form is complete, the respondent needs only to click the "submit" button at the close of the form and it is transmitted to the GLOBE evaluation file server.

To view the middle school student assessment, access the following URL:

http://globe.ctl.sri.com/servlet/globe.gat.GetFile/index.html
Log in with the following user name: GLOBE1OMB
Password: Protocol

To view the high school student assessment, access the following URL:

http://globe.ctl.sri.com/servlet/globe.gat.GetFile/index1.html
Log in with the following user name: GLOBE2OMB
Password: Protocol

4. Efforts to Identify Duplication

No other surveys are being conducted for the GLOBE Program regarding implementation at school sites, appropriateness and usefulness of the educational activities, usefulness of the technology, and awareness and attitudes of teachers and students toward science. Nor are other student assessments being conducted that focus on environmental awareness and the acquisition of student problem-solving skills using the Earth science and math concepts taught in GLOBE. SRI has (1) investigated thoroughly the information gathering that is being done within the program (e.g., student reports of data gathering), and (2) briefed scientist PIs and others involved in developing measurement protocols and educational activities on the evaluation requirements, and solicited complete information on any information they might ask of local sites. We have found no duplication.

5. Impact on Small Entities

No small business entities are proposed as respondents. All possible efforts have been made to prepare and carry out the surveys, assessments, and site visits so as to minimize the burden on GLOBE schools, which are mostly entities associated with local governing bodies.

6. Consequence If Collection Conducted Less Frequently

The GLOBE Program has a built-in flexibility that enables it to make necessary changes as it develops. These changes will be made on the basis of reliable information that is gathered from the sites where the program is being implemented. This is one of the main purposes of the evaluation.

After the first year of the GLOBE evaluation, new scientific investigations and associated educational activities are expected to undergo initial implementation. Two major changes will be that many more teachers will have received their GLOBE training from franchise partners than in the past and a new Teacher's Guide will be made available in 2000. When these changes occur, the GLOBE Program will have an urgent need for information regarding (1) the usability of these materials as presented in the new Teacher's Guide,(2) the adequacy of new teacher training formats and of strategies being used in the franchises, and (3) the adequacy of teacher training formats and strategies being used for "refresher training" of GLOBE teachers who were trained with earlier protocols and editions of the Teacher'sGuide. The SY 1999/00 survey will capture, for the first time, large numbers of teachers trained by franchise partners. The large number of teachers in the sample will allow us to identify new, empirically verified strategies being used by the franchises in training teachers to use GLOBE. In addition, results of the SY 2000/01 and 2001/02 surveys will provide information on the usability of the new materials in the revised Teachers Guide and the adequacy of teacher training formats and strategies used for "refresher training" with teachers who were trained with earlier protocols and materials.

7. Collection Compliant with OMB Guidelines

Data collection is fully in compliance with OMB data collection guidelines in 5 CFR 1320.6 (Controlling Paperwork Burdens on the Public–General Information Collection Guidelines).

8. Consultation with Persons outside the Agency

A number of persons outside the GLOBE Federal agencies have been involved in the evaluation design and in the development of surveys and assessments. They include:

- Dr. Harold McWilliams and Ms. Sue Doubler, TERC, Cambridge, MA. These TERC researchers have been involved with GLOBE for years and are currently studying multischool models for GLOBE implementation.
- Dr. Barbara Means is the evaluation's principal investigator and a nationally recognized expert in evaluating technology-based programs. She is Associate Director of SRI's Center for Technology in Learning. In addition to leading the first GLOBE evaluation (May 1995-April 1998), Dr. Means recently completed the evaluation of the Global Lab Curriculum, and is currently supervising the Joint Venture: Silicon Valley Challenge 2000 Technology Learning Project. She serves as a member of the advisory boards for the World Bank's World Links for Development initiative (linking secondary schools in developing countries through the World Wide Web), the Student Scientist Partnership Consortium, and NASA's Classroom of the Future Program. Dr. Means' extensive experience in the evaluation of technology-based educational programs will enable her to develop and refine survey and assessment instruments that will be valid,

appropriate, and sensitive measures of the objectives and goals of the GLOBE Program.

- Dr. Elaine B. Coleman, a Senior Cognitive Psychologist within SRI's Center for Technology in Learning, will serve as co-PI for the GLOBE evaluation. Her research specialization is students' belief revision in the course of learning science. Dr. Coleman has been a member of the core team for the first GLOBE evaluation grant. Before coming to SRI, Dr. Coleman was an Assistant Professor at the College of Education, University of Delaware, and a McDonnell Postdoctoral Fellow at the University of California, Berkeley. Dr. Coleman will lead the development of assessments of student learning and environmental awareness.

- Dr. Whendee L. Silver, Assistant Professor of Ecosystem Ecology at the University of California, Berkeley, serves as the science co-PI for the evaluation. Dr. Silver's research is highly interdisciplinary, focusing on biogeological cycling in plant-soil-atmosphere interfaces. Her interest in making science knowledge accessible to the public and her interdisciplinary research background will make her a valuable contributor to the specification of important concepts for assessment and in maintaining the scientific integrity of the assessment items.

- Dr. William Penuel is a Research Social Scientist at the Center for Technology in Learning at SRI International. His research focuses on the assessment and evaluation of technology-based projects designed to support teachers, principals, and district administrators in implementing collaborative school reform initiatives. Currently, he is working as project leader on the Joint Venture: Silicon Valley Challenge 2000 project, the GLOBE evaluation, and the Joyce Foundation-funded study of technical supports for urban high school reform. Before coming to SRI, Dr. Penuel worked as a program evaluator in San Francisco, Nashville, and Cobb County, Georgia public schools and as a business partner of the Learning Society Network at OISE/University of Toronto. Dr. Penuel will assist with the development of assessments of student learning and environmental awareness.

- Dr. Geneva D. Haertel, Senior Educational Researcher at SRI International, will provide evaluation and assessment expertise. Dr. Haertel co-edited the *International Encyclopedia of Educational Evaluation* i*n 1991*. At SRI, she was a key contributor to the evaluation of the Global Lab Curriculum. Currently, she is a member of the design and development team responsible for the creation of a digital library of evaluation resources for the National Science Foundation. Dr. Haertel will provide expertise on the evaluation design, instrument development, and the implementation of the GLOBE evaluation.

9. Payment of Gift to Respondents

No payment of gifts to individual respondents is planned.

10. Assurance of Confidentiality

Respondents will be told that their identity relative to their completed survey and assessment instruments will be assured to the extent provided by law, including the

Freedom of Information Act, and subject to reasonable steps being taken in the processing and analysis of the data to attempt to avoid any unintentional dissemination of information with respondents' identities given.

The following actions will be taken to assure confidentiality of information about respondents. First, for teachers and students providing information on-line, respondents will use GLOBE school access control identification numbers regularly used to control access to the GLOBE data server on the Internet. When respondents complete the interactive survey or assessment instrument, each will have control of the entry of his or her own information and its transmission to SRI.

On receipt of the completed form into the file server, the respondent will be assigned a unique identification number through a program specially written for this task. The respondent's name will be removed from the form, the unique identifier attached, and the data transferred to the analysis databank.

In those cases where teachers prefer to complete a printed version of the questionnaire, the following controls will be established to assure confidentiality. Teachers using hard-copy survey forms will be asked to return their completed questionnaires in a sealed envelope. On receipt at SRI, questionnaires will be logged in and their unique identification numbers added.

SRI will also request standardized achievement test scores that have been aggregated at the classroom level. Because only classroom averages will be requested from schools, it will not be necessary to obtain parental permission. No individual student's achievement test score will be provided to SRI.

No individual data will be reported in this evaluation; only aggregate data will be analyzed. No list linking names and unique identification numbers will be generated from the database.

11. Justification for Questions of Sensitive Nature

No items of a sensitive nature are contained in these instruments.

12. Estimates of Respondent Burden

The respondent burden for the recipients of the GLOBE Teacher Survey, GLOBE Partner Coordinator Survey, Student Assessment, Scientist PI Survey, and Site Interviews (administrators, teachers and students) is described in this section. In addition, we consider the response burden for teachers who are supervising students completing the Student Assessment. Table 2 reports the information used to calculate the respondent burden, including the type of instrument, number of respondents, the estimated response rate, the estimated time each respondent will spend completing the task (including, for teachers, the time spent supervising students as they enter their data to complete the student assessment). These burden estimates are based on sample sizes and completion

rates provided in Item 1, Section B of this document—Description of Respondent Universe and Sample and Procedures for Collection of Information.

13. Estimated Costs to Respondents

There are no respondent costs other than labor hours, therefore no cost estimate has been included in Table 2.

14. Estimated Costs to Federal Government

The estimated cost to the Government for the evaluation process associated with this set of surveys, assessments, and site visits for Year 2, SY 1999-'00, is $305,636; Year 3, SY 2000'01, is $315,788; and Year 4, SY 2001-'02, is $328,546. These amounts cover all tasks associated with the Documentation and Evaluation component of the GLOBE Program, including: documenting student, teacher, trainer, and scientist activities over the electronic network; conducting teacher surveys in the spring of 2000, 2001, and 2002; conducting student assessments in the spring of 2000 and 2002; conducting the GLOBE partner survey in the spring of 2001 and 2002; conducting the Scientist PI survey in the spring of 2002; conducting observations and interviews in selected GLOBE sites in 2000, 2001, and 2002; analyzing all data; providing ongoing feedback to GLOBE participants, scientists, and program staff; and preparing reports.

15. Reasons for Change in Burden or Program

The total annual response hours requested have been reduced by focusing student assessments on the grade levels at which GLOBE is most often implemented.

16. Published Results

The results are not intended to be published, except as part of summary reports and papers about the GLOBE Program and its implementation.

17. Non-display of Expiration Date

The expiration date will be displayed on all surveys and assessments. Because of the informal, unstructured nature of the on-site focus groups and interviews, information concerning clearance expiration date will not be provided in those venues.

18. Exceptions to the Certification Statement

The certification statement will be used as shown on Teacher, Partner, and Student Surveys. Because of the informal, unstructured nature of the on-site focus groups and interviews, it will not be used in those venues.

Table 2

Calculation of Respondent Burden*

	No. of Respondents	Est. Resp Rate	Adjusted No. of Respondents	Est. Time Minutes	Total Hours Sample	Est. Cost
Spring, 1999/00						
Teacher Survey	1,000	80%	800	20	267	NA
Teacher Supervising Student Assessment	20	NA	NA	30	10	NA
GLOBE Student Assessment	500	80%	400	80	533	NA
Site Interviews: Administrators	6	NA	6	30	3.0	NA
Site Interviews: Teachers	12	NA	12	30	6	NA
Site Interviews: Student Focus Groups	72 students	NA	72	20	24	NA
Spring 2000/01						
Teacher Survey	450	80%	360	20	120	NA
GLOBE Partner Survey (U.S.)	80	80%	64	30	32	NA
Site Interviews: Administrators	6	NA	5	30	2.5	NA
Site Interviews: Teachers	12	NA	10	30	5	NA
Site Interviews: Student Focus Groups	72 students	NA	58	20	19	NA
Spring 2001/02						
Teacher Survey	450	80%	360	20	120	NA
Teacher Supervising Student Assessment	40	NA	NA	30	20	NA
GLOBE Student Assessment	1,000	80%	800	80	1067	NA
GLOBE Partner Survey (International)	120	80%	96	30	48	NA
Scientist PI Survey	12	80%	10	40	7	NA
Site Interviews: Administrators	6	NA	5	30	2.5	NA
Site Interviews: Teachers	12	NA	10	30	5	NA
Site Interviews:: Student Focus Groups	72 students	NA	58	20	19	NA

* The burden hours in Table 2 have been annualized on OMB Form 83-I.

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Description of Respondent Universe and Sample and Procedures for Collection of Information

In each of SY 1999/00, SY 2000/01, and SY 2001/02 , representative samples of GLOBE teachers will be identified and asked to participate in a survey. One thousand teachers will be identified in the first year, and 450 teachers in each of the subsequent years. The large number of teachers in the sample for Year 1 is needed to obtain sufficient numbers of teachers trained on the GLOBE Program with different approaches. The relative effectiveness of the different training approaches will be related to survey results.

For the student assessment field test, middle school/jr. high school and high school teachers who were involved in the GLOBE Program were identified through the GLOBE database in the spring of 1999. Two groups of classrooms were identified. First, a random sample of 20 classrooms whose average number of GLOBE observations was at least one standard deviation above the mean number of observations made by all contributing U.S. middle and high schools was identified as a High Implementing Group. A second sample of 20 classrooms whose average number of observations during this period was at least one standard deviation below the means was identified as a Low Implementing Group. These 40 classrooms were e-mailed to solicit their participation in the study. Follow-up telephone calls were made, and just under 50% agreed to participate. This same selection process will be used in future student assessments.

In SY 2001/02 a sample of middle/jr. high and high school classes who are actively implementing GLOBE will be identified, and their students will participate in an assessment. Approximately 250 students in participating GLOBE classes will be compared with students of similar grade level, from comparable schools in terms of urban and Title I status, whose teachers have been trained but have not yet implemented the GLOBE Program. The assessment used in SY 2001/02 will have been extended and refined on the basis of the results of the student assessment conducted in SY 1999/00.

Tables 3 and 4 show the estimated populations of teachers and students, as well as sample sizes and response rates, standard errors, and confidence intervals for the teacher surveys and student assessments. An assumption used in generating Table 4 is that the average class size for each teacher is 25.

Table 3
Population Size, Sample Size, Standard Error, and Confidence Interval for Spring 1999/00, 2000/01, and 2001/02 Teacher Surveys

Year of Teacher Survey	Estimated Population*	Target N of Respondents	Anticipated Response Rate	Effective Sample Size	Standard Error	Confidence Interval
1999/00	7,100	1,000	.80	800	0.017	0.033
2000/01	9,585	450	.80	360	0.026	0.051
2001/02	12,948	450	.80	360	0.026	0.051

*****As of February 1999, there were approximately 7,100 trained U.S. G LOBE teachers. During the past 4 years, the number of trained teachers has increased as follows: from spring 1995 to spring 1996, the percentage of trained teachers increased by 80%; from spring 1996 to spring 1997, the percentage of trained teachers increased by 41%; and from spring 1997 to spring, 1998, the percentage of trained teachers increased by 37%. The sizes of the estimated GLOBE teacher populations for 2000/01 and 2001/02 are based on an increase of 35% per year.

Table 4
Population Sizes, Sample Sizes, Standard Errors, and Confidence Intervals for Spring 1999/00 and 2001/02 Student Assessments

	Estimated Population	Estimated Target Number (of Classes)	Target N of Respondents	Anticipated Response Rate	Effective Sample Size	Standard Error	Confidence Interval
Spring 1999/00							
GLOBE Students							
Middle School	14,340	10	250	.80	200	0.035	0.069
High School	7,380	10	250	.80	200	0.035	0.068
Spring, 2001/02							
GLOBE Students							
Middle School	14,340	20	500	.80	400	0.025	0.048
High School	7,380	20	500	.80	400	0.024	0.048

We estimated the size of the population of middle and high school students in Table 3 as follows. As of March 1999, there were approximately 604 middle and high schools that were at least one standard deviation above or at least one standard deviation below the mean in the number of GLOBE observations they had submitted between September 1998 and February 1999. These 604 schools became the population of schools from which the sample was drawn. In estimating the population of middle school and high school students involved, we assumed that each school had 1.2 classrooms that met the criteria and 25 students per class. The same estimates of population size were used for both 1999/00 and 2000/01.

Decisions regarding number of respondents to target for surveys and assessments have taken into account burden, cost, statistical, and analytical considerations. In all cases, anticipating response rates of 80%, our target numbers of respondents will result in an acceptable level of statistical precision for our estimates. Using the conservative estimate of a

dichotomous variable with a .50 probability of each response,[1] the effective sample sizes produce standard errors ranging from 0.017 to 0.035.[2] The resulting confidence intervals for our estimates would then range from ±3.3 percentage points to ±6.9 percentage points for the various samples. That is if 50% of teachers answered "yes" to a particular item on the 2001/02 teacher survey, the confidence interval for our estimate would range from 45% to 55%.

2. Schedule and Procedures for Collection of Information

Schedule and procedures for collection of information are as follows.

Data Collection Schedule and Procedures

SY 1999/00

Spring Teacher Survey

March 8	Notification of survey to teacher respondents
March 15	Survey made available to teacher respondents
April 5	First follow-up of nonrespondents
April 19	Second follow-up
May 3	Third follow-up

[1]The sample size needed to produce reasonably precise estimates differs from variable to variable, depending on the standard deviation of the variable in question. Because only one sample size can be chosen for a survey, a conservative technique is to calculate standard errors and confidence intervals using a "worst case" scenario. For dichotomous (e.g., yes/no) variables, this "worst case" scenario results when the expected proportions of responses in both categories are equal (i.e., 50% of respondents answering "yes" and 50% answering "no").

[2]Standard errors were calculated as follows:

where p is the probability of a "yes" response, q is the probability of a "no" response, n is the effective sample size, and N is the population size. The term

is a standard correction for small population sizes.

Data Collection Schedule and Procedures (Continued)

Spring Web-Based Student Assessment

March 1	Notification of Web-based assessment to teacher supervisors
March 13	Web assessment made available to student respondents
April 3	First follow-up of nonresponding classes
April 17	Second follow-up
May 1	Third follow-up

SY 2000/01

Spring 2000/01 Teacher Survey

March 8	Notification of survey to teacher respondents
March 15	Survey made available to teacher respondents
April 5	First follow-up of nonrespondents
April 19	Second follow-up
May 3	Third follow-up

GLOBE Partner Survey

March 15	Notification of survey to partner respondents
March 24	Survey made available to partner respondents
April 14	First follow-up of nonrespondents
April 28	Second follow-up
May 12	Third follow-up

SY 2001/02

Spring Teacher Survey

March 1	Notification of survey to teacher respondents
March 8	Survey made available to teacher respondents
April 5	First follow-up of nonrespondents
April 19	Second follow-up
May 3	Third follow-up

Data Collection Schedule and Procedures (Concluded)

Scientist PI Survey

March 15	Notification of survey to scientist PI respondents
March 24	Survey made available to scientist PI respondents
April 14	First follow-up of nonrespondents
April 28	Second follow-up
May 12	Third follow-up

GLOBE Partner Survey

March 15	Notification of survey to partner respondents
March 24	Survey made available to partner respondents
April 14	First follow-up of nonrespondents
April 28	Second follow-up
May 12	Third follow-up

Spring Student Assessment

March 15	Notification of assessment to teacher supervisors
March 24	Assessment made available to student respondents
April 14	First follow-up of nonrespondents
April 28	Second follow-up
May 12	Third follow-up

3. Maximizing Response Rates; Issues of Nonresponse

As shown above, a rigorous schedule has been developed for notifying respondents prior to the survey and for following up on nonrespondents. Our experience has shown that providing notification of a survey before it is conducted and following survey dissemination with up to 3 mail, e-mail, or telephone reminders produces a very high rate of response. Because of these procedures, the high morale among the GLOBE teachers, and the low burden entailed in completing the form, it is anticipated that response rates for active GLOBE teachers will be 80%. We have estimated response rate of 80% or more for the GLOBE partner survey, the survey of scientist PIs, and the student assessment, as well.

4. Tests of Procedures and Methods

The on-line teacher survey has been used in three prior years. It has undergone minor modifications from year to year, reflecting lessons learned from prior years' data and changes in GLOBE Program content. The student assessment was field tested with 120 small groups of students drawn from 8 classrooms in the spring of 1999. Approximately

500 students will complete the revised assessment in the spring of 2000. A second assessment will be administered in the spring of SY 2000/01.

5. Persons Responsible for Data Collection Design and Development

Dr. Barbara Means of SRI International is principal investigator for the Documentation and Evaluation component of GLOBE and is responsible for data analysis and reporting. She is also responsible for the design of the teacher surveys, GLOBE partner survey, and scientist PI survey. Dr. Elaine Coleman serves as co-PI, and with Dr. Bill Penuel, will be responsible for on-line data collection design and development and data dissemination, including the design for the student assessments and report writing. Dr. Geneva Haertel will contribute to the design of the evaluation and the development and design of items for teacher surveys and student assessment. Their addresses are as follows:

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APPENDIX A

DATA COLLECTION INSTRUMENTS

- Teacher Survey
- GLOBE Student Assessment—Form 1, Middle/Jr. High School
- GLOBE Student Assessment—Form 2, High School Form 2
- GLOBE Partner Survey
- Scientist PI Survey
- Site Visit Protocols

FORMS NOT ATTACHED ELECTRONICALLY